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HISTORICAL NOTE

Charles Miller Fisher: the 65th anniversary of the publication of his groundbreaking study "Transient Monocular Blindness Associated with Hemiplegia"

Charles Miller Fisher: 65 anos da publicação de seu estudo inovador "Cegueira monocular transitória associada com hemiplegia"

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ABSTRACT

Charles Miller Fisher is considered the father of modern vascular neurology and one of the giants of neurology in the 20th century. This historical review emphasizes Prof. Fisher's magnificent contribution to vascular neurology and celebrates the 65th anniversary of the publication of his groundbreaking study, "Transient Monocular Blindness Associated with Hemiplegia."

Keywords: transient ischemic attack; amaurosis fugax; hemiplegia.

RESUMO

Charles Miller Fisher é considerado o pai da neurologia vascular moderna, e um dos gigantes da neurologia no século XX. Esta revisão histórica enfatiza a magnífica contribuição de Miller Fisher na neurologia vascular, particularmente com a celebração dos 65 anos de publicação do seu estudo inovador intitulado "Cegueira monocular transitória associada com hemiplegia".

Palavras-chave: ataque isquêmico transitório; amaurose fugaz; hemiplegia.

Fifteen years ago, the definition of transient ischemic attack, or TIA, was changed by the TIA Working Group to "a brief episode of neurological dysfunction caused by focal brain or retinal ischemia with clinical symptoms typically lasting less than one hour and without evidence of acute brain infarction"[1]. The classic definition of TIA was a sudden, focal neurologic deficit of vascular origin that lasts for less than 24 hours and is confined to an area of the brain or eye perfused by a specific artery[2]. Typical symptoms include hemiparesis, hemiparesthesia, dysarthria, dysphasia, diplopia, ataxia and monocular blindness[2]. Charles Miller Fisher is considered to have been one of the world's greatest neurologists, a master of neurological observation and the father of modern stroke neurology. He created the first stroke service in the world, at the Massachusetts General Hospital, in the USA[3,4]. Among the many important contributions he made to general neurology, and stroke in particular, is the world-famous paper "Transient Monocular Blindness Associated with Hemiplegia" published 65 years ago, in 1952, in which he describes a particular type of TIA[5]. The aim of this historical review is to celebrate this pioneering contribution by Fisher.

SHORT BIOGRAPHY

Charles Miller Fisher (Figure 1) was born in 1913 in Waterloo, Canada, and graduated from the University of Toronto Medical School in 1938[3,4]. He joined the Royal Canadian Navy after completing medical school, where he served as a surgical lieutenant. During the Second World War, the ship on which he was serving, the HMS Voltaire, was attacked by a German vessel in the south Atlantic[3,4]. He became a Nazi prisoner for more than three years, until he was repatriated in 1944. In 1948 he completed

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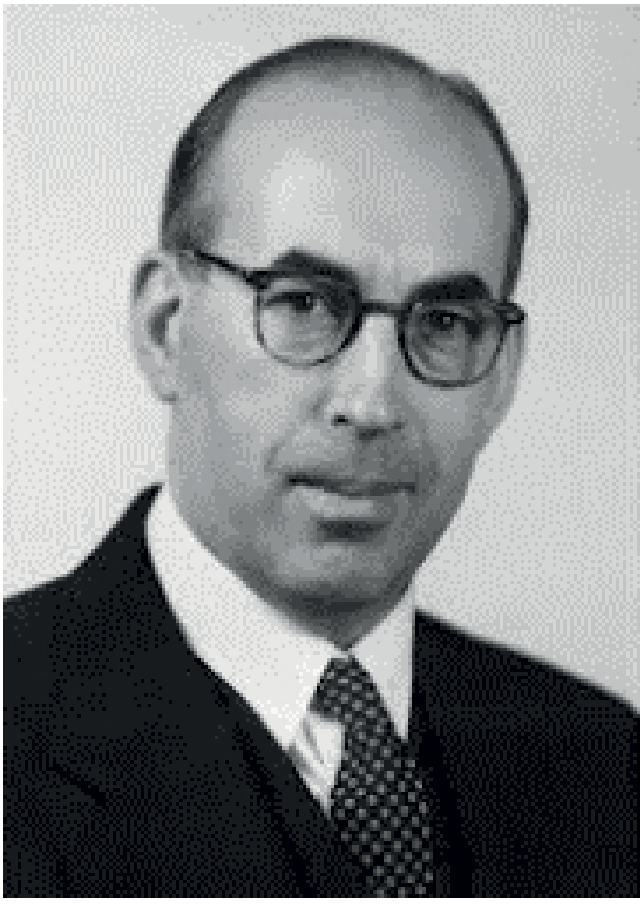
his neurological studies at the Montreal Neurological Institute under the supervision of Dr. Wilder Penfield[3,4]. Fisher subsequently moved to Boston, MA, USA, where he did a neuropathology fellowship at Boston City Hospital (1949-1950) under the supervision of Prof. Raymond Adams[3,4]. Between 1950 and 1954, he worked at the Montreal General Hospital, McGill University, as a clinical neurologist and neuropathologist. During this period, he participated in several studies on the causes and treatment of stroke, including the relationship between stenosis of the carotid artery, TIA and stroke[3,4]. In 1954, he was invited by Adams to work at the Massachusetts General Hospital and Harvard University, where he created the first stroke service in the world. Fisher died on April 14, 2012, in Albany, N.Y., USA, at the age of 98 years[3,4].

FISHER'S GROUNDBREAKING PAPER, "TRANSIENT MONOCULAR BLINDNESS ASSOCIATED WITH HEMIPLEGIA"

This year, 2017, sees the 65th anniversary of the publication of the classic paper by Fisher, "Transient Monocular Blindness Associated with Hemiplegia" (Figure 2), which was to usher in a new era in vascular neurology[5]. In this clinical study, Fisher analyzed seven patients with transitory blindness and observed that this finding could be "a sort of warning that disaster threatened"[2,5]. At the time, he changed the term that he had used previously, transient unilateral blindness, to transient monocular blindness, to avoid confusion with unilateral loss of vision from hemianopsia[2,5]. He described his first patient diagnosed with this clinical condition in 1950, when he was at the Queen Mary Veterans' Hospital, Montreal, Canada: "A patient with a left-sided paralysis reported that, before his stroke, he had several brief spells of blindness in his right eye"[2,5,6]. The patient himself commented, "Isn't it funny, it was in the wrong eye? I went blind in the right eye and got paralyzed on the left side." The patient had metastatic colorectal cancer and died soon afterward. The autopsy revealed occlusion of the right internal carotid artery in the neck (Figure 3)[2,5,6]. Fisher also described 150 cases in the literature in which transient monocular blindness was associated with different causes (arteriosclerosis, spasm, migraine, Raynaud's disease, reflex amaurosis and arteritis) but not, at the time, with carotid artery disease[2,7]. Fisher initially believed that the basic mechanism involved vasospasm but said that "the exact relation of the carotid occlusion to the transient phenomena is far from clear"[2,5]. However, subsequent studies of carotid stenosis between 1954 and 1962 and the definition of TIA (transient ischemic attack, with brain ischemic lesions completely resolved in less than 24 hours) led Fisher to conclude in 1976, that the basic mechanism of transient monocular blindness was related to the presence of microembolism ("The microembolic theory of transient ischemic attacks")[2,8]. He remarked, "It's amazing how facts, that today are readily obvious, were ignored at that time"[2] and,



(Courtesy of Professor Jay P. Mohr)
Figure 1. Charles Miller Fisher (1913-2012).

TRANSIENT MONOCULAR BLINDNESS ASSOCIATED WITH HEMIPLEGIA

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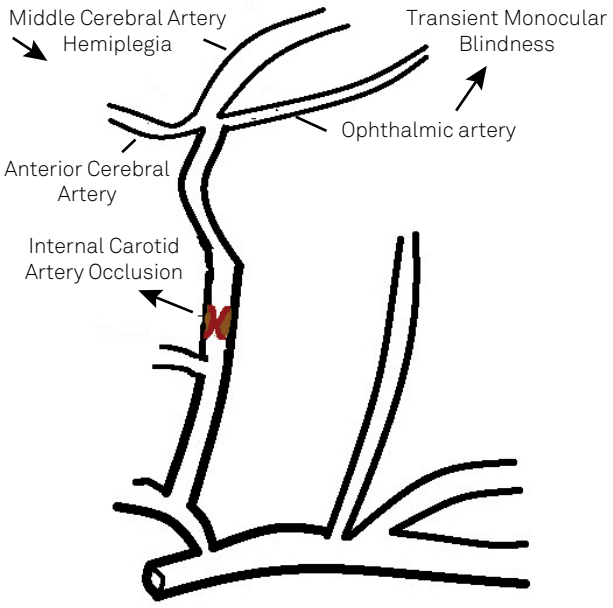
INTRODUCTION

TEMPORARY obscuration of vision, unilateral or bilateral is not uncommon, especially if under that heading one includes the transient amaurosis associated with spasm of accommodation, glaucoma, and hysteria. The visual disturbance accompanying migraine is another common example. Rarer causes of intermittent blindness include eclampsia, lead poisoning, ergot poisoning, malaria, quinine and tobacco intoxication, polycythaemia rubra vera, and paroxysmal hemoglobinuria. Circulatory deficiency in the territory of the basilar and posterior cerebral arteries may also occasion transient disturbances in vision. The bizarre, rapidly changing field defects complained of in the presence of papilledema, particularly when it is due to intracranial venous thrombosis, are less well known.

In addition to the above types, however, there is a fairly large number of cases of periodic blindness in which the principal derangement is an interruption of the retinal blood flow, usually of one eye only. It is this group of cases which is under discussion in this paper. Of obscure etiology and not lending itself to easy or simple classification, this condition has been the subject of sporadic reports during the past century. Intermittent monocular blindness due to retinal anemia constitutes a large fraction of what has been labeled amaurosis fugax, and it is probably better known under that name. Duke-Elder [1] includes cases of this condition under "angiospasm" and divides them into two classes: cases occurring in young

(AMA Arch Ophthalmol 1952; 47: 187-203).
Figure 2. Fisher's paper on transient monocular blindness associated with hemiplegia.



(Schematic original figure).
Figure 3. Schematic figure of the site of the internal carotid artery occlusion in Fisher's first patient with transient monocular blindness associated with hemiplegia.

in 1989, he declared that he opposed the use of the term "amaurosis fugax", preferring the term he had defined previously (transient monocular blindness)[9].

FISHER'S IMPORTANT CONTRIBUTIONS TO NEUROLOGY

Fisher made numerous contributions to vascular neurology. These were not limited to the study of atherosclerotic stenosis of the carotid artery but included the discovery of carotid artery dissection as a cause of stroke, demonstration of the role of atrial fibrillation as a cause of stroke, discovery of the benefits of the use of anticoagulants in cerebrovascular disease, the definition of TIA, a study of carotid endarterectomy plaques, a description of the main lacunar infarction syndromes (pure motor hemiparesis, pure sensory stroke, ataxic hemiparesis and dysarthria-clumsy hand syndrome), identification of the correlation between limb shaking and carotid artery disease, a description of thalamic and cerebellar hemorrhage, discovery of the role of migraine in stroke and development of the Fisher score for assessing aneurysmal subarachnoid hemorrhage[2,3,4,5,6,7,8,10]. Other important contributions by Fisher were descriptions of the following syndromes: Miller Fisher syndrome (a variant of Guillain-Barré syndrome); normal pressure hydrocephalus; transient global amnesia; the one-and-a-half syndrome (due to ocular-pontine deficit); wrong-way eyes (with thalamic hemorrhage); pontine ptosis; oval pupils; and rostral-caudal deterioration (in the comatose patient)[2,3,4].

CONCLUSION

Fisher made extremely important contributions to general neurology and vascular neurology in particular. The year 2017 sees the celebration of the 65th anniversary of the publication of one of his most important contributions to science, the paper "Transient Monocular Blindness Associated with Hemiplegia"[5].

Acknowledgments

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